

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Atty. Docket: US030477US2

WOJTEK SUDOL

Group Art Unit: 2834

Serial No.: 10/596,181

Examiner: THOMAS M. DOUGHERTY

Filed: JUNE 2, 2006

CONF. NO.: 2881

TITLE: IMPLEMENTING IC MOUNTED SENSOR WITH HIGH ATTENUATION  
BACKING

**Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**

**APPEAL BRIEF**

Sir:

Appellant herewith respectfully presents its Brief on Appeal as follows:

REAL PARTY IN INTEREST

The real party in interest is Koninklijke Philips Electronics N.V., a corporation of The Netherlands having an office and a place of business at Groenewoudseweg 1, Eindhoven, Netherlands 5621 BA.

RELATED APPEALS AND INTERFERENCES

To the best of Appellant's knowledge and belief, there are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-20 are pending in this application. Claims 1-20 are rejected in the Final Office Action that issued May 22, 2008. This rejection was upheld, in an Advisory Action that mailed on August 7, 2008. Claims 1-20 are the subject of this appeal.

STATUS OF AMENDMENTS

An Amendment After Final Action was submitted on July 22, 2008 in response to a Final Office Action mailed on May 22, 2008. The Amendment After Final Action did not include any amendments. In an Advisory Action mailed on August 7, 2008, it is indicated that the After Amendment After Final Action was considered but does not place the application in condition for allowance. This Appeal Brief is in response to the Final Office Action mailed May 22, 2008, that finally rejected claims 1-20, which remain finally rejected in the Advisory Action mailed on August 7, 2008.

### SUMMARY OF CLAIMED SUBJECT MATTER

The present invention, for example as claimed in claim 1, relates to an ultrasound transducer probe (e.g., see, present patent application, FIG. 4, ultrasound transducer probe 80 and accompanying description contained on page 2, line 30). The ultrasound transducer probe includes an attenuation backing substrate (e.g., see, present patent application, attenuating backing material 94 and accompanying description contained on page 3, line 9), an integrated circuit coupled to the attenuation backing substrate (e.g., see, present patent application, integrated circuit 88 and accompanying description contained in the abstract and on page 2, line 33 through page 3, line 1). The integrated circuit is translucent to acoustic waves (e.g., see, present patent application, page 3, lines 3-4). The ultrasound transducer probe includes an array of piezoelectric elements coupled to the integrated circuit (e.g., see, present patent application, integrated circuit 88, piezoelectric elements 84 and accompanying description contained on page 2, line 32 through page 3, line 2). The array of piezoelectric elements have an acoustic matching layer disposed on a first surface of the array (e.g., see, present patent application, matching layer 86 and accompanying description contained on page 2, lines 32-33). The thickness of the integrated circuit is less than 50  $\mu\text{m}$  (e.g., see, present patent application, page 3, lines 4-5).

The present invention, for example as claimed in claim 9, relates to an ultrasound transducer probe (e.g., see, present patent application, FIG. 4, ultrasound transducer probe 80 and accompanying description contained on page 2, line 30) including an attenuation backing substrate (e.g., see, present patent application, attenuating backing material 94 and accompanying description contained on page

3, line 9). The attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 Mhz (e.g., see, present patent application, page 4, lines 10-11). An integrated circuit is coupled to the attenuation backing substrate (e.g., see, present patent application, integrated circuit 88 and accompanying description contained in the abstract and on page 2, line 33 through page 3, line 1). The integrated circuit is translucent to acoustic waves (e.g., see, present patent application, page 3, lines 3-4). The integrated circuit includes a thickness of from 5  $\mu\text{m}$  to less than 50  $\mu\text{m}$  and is sufficient for causing the integrated circuit to be translucent to acoustic waves (e.g., see, present patent application, page 3, lines 4-5 and page 4, lines 15-17). The ultrasound transducer probe includes an array of piezoelectric elements coupled to the integrated circuit (e.g., see, present patent application, integrated circuit 88, piezoelectric elements 84 and accompanying description contained on page 2, line 32 through page 3, line 2). The array of piezoelectric elements have an acoustic matching layer disposed on a first surface of the array (e.g., see, present patent application, matching layer 86 and accompanying description contained on page 2, lines 32-33).

The present invention, for example as claimed in claim 11, relates to an ultrasound diagnostic imaging system (e.g., see, present patent application, FIG. 5, ultrasound diagnostic imaging system 100 and accompanying description contained on page 3, lines 14-15) utilizing an ultrasound transducer probe (e.g., see, present patent application, FIG. 4, ultrasound transducer probe 80 and accompanying description contained on page 2, line 30) including an attenuation backing substrate (e.g., see, present patent application, attenuating backing material 94 and accompanying description contained on page 3, line 9). The attenuation backing substrate includes a material capable of

providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 Mhz (e.g., see, present patent application, page 4, lines 10-11). An integrated circuit is coupled to the attenuation backing substrate (e.g., see, present patent application, integrated circuit 88 and accompanying description contained in the abstract and on page 2, line 33 through page 3, line 1). The integrated circuit is translucent to acoustic waves (e.g., see, present patent application, page 3, lines 3-4). The integrated circuit includes a thickness of from 5  $\mu\text{m}$  to less than 50  $\mu\text{m}$  and is sufficient for causing the integrated circuit to be translucent to acoustic waves (e.g., see, present patent application, page 3, lines 4-5 and page 4, lines 15-17). The ultrasound transducer probe includes an array of piezoelectric elements coupled to the integrated circuit (e.g., see, present patent application, integrated circuit 88, piezoelectric elements 84 and accompanying description contained on page 2, line 32 through page 3, line 2). The array of piezoelectric elements have an acoustic matching layer disposed on a first surface of the array (e.g., see, present patent application, matching layer 86 and accompanying description contained on page 2, lines 32-33).

The present invention, for example as claimed in claim 12, relates to a method of fabricating an ultrasound transducer probe (e.g., see, present patent application, page 4, line 32 through page 5, line 16). The method includes providing an attenuation backing substrate (e.g., see, present patent application, attenuating backing material 94 and accompanying description contained on page 3, line 9 and page 4, lines 32-33). An integrated circuit is coupled to the attenuation backing substrate (e.g., see, present patent application, integrated circuit 88 and accompanying description contained in the abstract and on page 2, line 33 through page 3, line 1) having a thickness less than 50  $\mu\text{m}$ , wherein the integrated circuit is translucent to acoustic waves (e.g., see, present patent application, page 3,



lines 4-5, and page 5, lines 10-14). An array of piezoelectric elements is coupled to the integrated circuit (e.g., see, present patent application, integrated circuit 88, piezoelectric elements 84 and accompanying description contained on page 2, line 32 through page 3, line 2, and page 5, lines 14-15). The array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array (e.g., see, present patent application, matching layer 86 and accompanying description contained on page 2, lines 32-33, and page 5, lines 15-16).

The present invention, for example as claimed in claim 20, relates to a method of making an ultrasound transducer probe (e.g., see, present patent application, page 4, line 32 through page 5, line 16). The method includes providing an attenuation backing substrate (e.g., see, present patent application, attenuating backing material 94 and accompanying description contained on page 3, line 9 and page 4, lines 32-33), wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 MHz (e.g., see, present patent application, page 5, lines 9-10). An integrated circuit is coupled to the attenuation backing substrate (e.g., see, present patent application, integrated circuit 88 and accompanying description contained in the abstract and on page 2, line 33 through page 3, line 1), wherein the integrated circuit includes a thickness of from 5  $\mu\text{m}$  to less than 50  $\mu\text{m}$  and is sufficiently small for causing the integrated circuit to be translucent to acoustic waves (e.g., see, present patent application, page 3, lines 4-5, and page 5, lines 10-14). An array of piezoelectric elements is coupled to the integrated circuit (e.g., see, present patent application, integrated circuit 88, piezoelectric elements 84 and accompanying description contained on page 2, line 32 through page 3, line 2, and page 5, lines 14-15). The array of piezoelectric elements having an acoustic matching layer disposed

on a first surface of the array (e.g., see, present patent application, matching layer 86 and accompanying description contained on page 2, lines 32-33, and page 5, lines 15-16).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 4, 5, 8, 12, 15, 16 and 19 of U.S. Patent Application Serial No. 10/596,181 are obvious under 35 U.S.C. §103(a) over U.S. Publication Patent No. 2003/0018267 to Erikson ("Erikson").

Whether claims 2, 9, 11, 13 and 20 of U.S. Patent Application Serial No. 10/596,181 are obvious under 35 U.S.C. §103(a) over Erikson.

Whether claims 3, 10 and 14 of U.S. Patent Application Serial No. 10/596,181 are obvious under 35 U.S.C. §103(a) over Erikson in view of Japanese Patent Publication No. JP 06-090950 to Odaka ("Odaka").

Whether claims 6 and 17 of U.S. Patent Application Serial No. 10/596,181 are obvious under 35 U.S.C. §103(a) over Erikson in view of Patent Publication No. 2006/0150380 to Ossman ("Ossman").

Whether claims 7 and 18 of U.S. Patent Application Serial No. 10/596,181 are obvious under 35 U.S.C. §103(a) over Erikson in view of U.S. Patent No. 5,655,276 to Pattanayak ("Pattanayak").

ARGUMENT

Claims 1, 4, 5, 8, 12, 15, 16 and 19 are said to be obvious over Erikson.

Appellant respectfully requests the Board to address the patentability of independent claims 1 and 12, and further claims 4, 5, 8, 15, 16 and 19 as respectively depending from one of independent claims 1 and 12, based on the requirements of independent claims 1 and 12. This position is provided for the specific and stated purpose of simplifying the current issues on appeal. However, Appellant herein specifically reserves the right to argue and address the patentability of claims 4, 5, 8, 15, 16 and 19 at a later date should the separately patentable subject matter of claims 4, 5, 8, 15, 16 and 19 later become an issue. Accordingly, this limitation of the subject matter presented in this section herein, specifically limited to discussions of the patentability of independent claims 1 and 12 is not intended as a waiver of Appellants' right to argue the patentability of the further claims and claim elements at that later time.

Erikson shows an ultrasonic array 13 connected to an integrated circuit (IC) 32 via bump pads 34 (see, FIG. 5 and paragraph [0047]). Erikson further shows that the substrate of the IC may be thinned to reduce crosstalk. While, Erikson shows that the silicon may be thinned down to 50  $\mu\text{m}$ , it is respectfully submitted that Erikson does not suggest that thinning down generally leads to more transparency of the IC as suggested in the Final Office Action (see, Final Office Action, bottom of page 3 continuing to top of page 4). The Final Office Action mischaracterizes Erikson as showing that (emphasis added) "Erikson et al. clearly teach the desirability and advantage of having an

acoustically translucent IC and the achievement of such by making the component thin. Therefore it would have been obvious to one of ordinary skill in the art to achieve even greater acoustic translucence by having the IC component thinner than 50  $\mu\text{m}$ ." It is interesting to note that while the Final Office Action makes this assertion, it cites no sections of Erikson for supporting this allegation.

In fact, Erikson merely suggests that the prior art technology is capable of thinning an IC to 50  $\mu\text{m}$ , yet in fact suggests a more suitable figure to be of the order of 210-420  $\mu\text{m}$  (see, page 4, paragraph [0049]). Even a cursory review of Erikson makes clear that Erikson in fact teaches that thinner beyond a value of the order of 210-420  $\mu\text{m}$  for a frequency of between 5-10 MHZ results in more reflectivity. In fact, Erikson FIGs. 6 and 7 make clear that as the IC is thinned below that which is taught by Erikson (420  $\mu\text{m}$  for a frequency of 5 MHZ), the reflectivity is increased! Accordingly, Erikson in fact teaches away from thinning the IC below the range suggested to decrease reflectivity. No person of ordinary skill in the art would take Erikson to disclose or suggest thinning the IC to "less than 50  $\mu\text{m}$ " as substantially recited in each of independent claims 1, 9, 11, 12 and 20.

It is respectfully submitted that the Final Office Actions recitation of In re Aller ("Aller") for support of the allegation that discovering an optimal range of Erikson, renders the claims obvious is misplaced. It is respectfully submitted that the analysis applied by Aller is applicable in a case wherein "subject matter [is] encompassed by the prior art ..." (See, MPEP, §2144.05 II(A)), and thereby applies to an optimization of a previously disclosed range. While that court found that a range not encompassed was obvious, the ranges disclosed by Aller were particularly close to the ranges claimed (in Aller, temperature a between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only

in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.)

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. In *re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1442, 1444 (Fed. Cir. 1992). See also *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. In *re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). MPEP §2142 makes clear that "[t]he examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of non-obviousness.

It is respectfully submitted that the Office Action has not met the burden of making a prima facie case of obviousness under 35 U.S.C. §103. In alleging that Erikson teaches in effect thinner is less reflective, without explaining some basis for that conclusion, when in fact somewhat the opposite is taught by Erikson (e.g., thinner than 420  $\mu\text{m}$  for a frequency of 5 MHZ results in more reflectivity as shown by FIGs. 6 and 7), does not establish a prima facie case of obviousness. It is not the Appellant's burden to establish non-obviousness when the initial burden is not met by the Final Office Actions allegations.

In Erikson, the ranges of the pending claims are not encompassed and in fact, Erikson teaches away from the range recited in the claims as discussed above. As made clear in MPEP, §2144.05 III, (citation provided, emphasis added) "[a] prima facie case of obviousness may also be rebutted[ ,

although in this case, it is asserted this burden has not been met as discussed above, ] by showing that the art, in any material respect, teaches away from the claimed invention. In re Geisler, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)

It is respectfully submitted that clearly Erikson in general and FIGs. 6 and 7 particularly, teach away from the presently claimed invention. There is no suggestion to modify a prior art reference where the modification would render the device inoperable for its intended purpose. (In re Gordon, 733 F.2d 900 (Fed. Cir. 1984.)) Reducing thickness in the system as taught by Erikson would result in a system with increased reflectivity and therefore renders Erikson inoperable for its intended purpose. A person of ordinary skill in the art would never look to modify Erikson by reducing the thickness of the IC below the range taught because as taught by Erikson, the result is increased reflectivity.

The Advisory Action alleges that the Appellant has ignored the Final Office Action reference to Erikson, paragraph [0048], wherein it is stated that "This extremely thin layer is also acoustically transparent and could be neglected in the calculations for FIG. 8." This position is reflected refuted. paragraph [0048] of Erikson refers to FIG. 6 which is discussed in great detail above. While it is true that paragraph [0048], states in substantial part that "[t]his extremely thin layer is also acoustically transparent and could be neglected in the calculations for FIG. 8, FIG. 6 which is referenced in paragraph [0048] clearly shows that as the IC is thinned below that which is taught by Erikson (420  $\mu$ m for a frequency of 5 MHZ), the reflectivity is increased. Accordingly, no person of ordinary skill in the art would understand the reference contained in paragraph [0048] to refer to other than the 420  $\mu$ m IC for a frequency of 5 MHZ.

It is respectfully submitted that as taught by Erikson, to reduce the IC thickness below the 420  $\mu\text{m}$  for a frequency of 5 MHZ, would have an effect of greatly increasing the reflectivity of the IC (indicated as a reflection coefficient in FIG. 6). It is not clear how the Advisory Action would interpret the discussion contained in paragraph [0048] of Erikson, together with the discussed FIG. 6, to mean other than an integrated circuit thickness of 420  $\mu\text{m}$  since Erikson clearly teaches that reducing the integrated circuit thickness below 420  $\mu\text{m}$  would result in increased reflectivity. How can the Final Office Action and Advisory Action espouse otherwise when the teaching of Erikson and FIG. 6 in particular are obvious to a person of ordinary skill in the art and contradict the assertions in the Final Office Action and the Advisory Action.

Accordingly, it is respectfully submitted that the probe of claim 1 is not anticipated or made obvious by the teachings of Erikson. For example, Erikson does not disclose or suggest, a probe that amongst other patentable elements, comprises an (illustrative emphasis added) "ultrasound transducer probe, comprising: an attenuation backing substrate; an integrated circuit coupled to the attenuation backing substrate, wherein the integrated circuit is translucent to acoustic waves; and an array of piezoelectric elements coupled to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof, wherein the thickness of the integrated circuit is less than 50  $\mu\text{m}$ " as recited in claim 1, and as similarly recited in claim 12. It is respectfully submitted that Erikson does not disclose the claimed range and in fact teaches away from even its consideration.

Based on the foregoing, the Appellant respectfully submits that independent claims 1 and 12 are patentable over Erikson and notice to this effect is earnestly solicited. Claims 4, 5, 8, 15, 16 and



19 respectively depend from one of claims 1 and 12 and accordingly are allowable for at least this reason as well as for the separately patentable elements contained in each of the claims. Accordingly, separate consideration of each of the dependent claims is respectfully requested.

Based on the foregoing, the Appellants respectfully submit that claims 1, 4, 5, 8, 12, 15, 16 and 19 are patentable over Erikson and notice to this effect is earnestly solicited.

Claims 2, 9, 11, 13 and 20 are said to be unpatentable over Erikson.

Appellant respectfully requests the Board to address the patentability of independent claims 9, 11 and 20, and further claims 2 and 13 as respectively depending from one of independent claims 1 and 12, based on the requirements of independent claims 1, 9, 11, 12 and 20. This position is provided for the specific and stated purpose of simplifying the current issues on appeal. However, Appellant herein specifically reserves the right to argue and address the patentability of claims 2 and 13 at a later date should the separately patentable subject matter of claims 2 and 13 later become an issue. Accordingly, this limitation of the subject matter presented in this section herein, specifically limited to discussions of the patentability of independent claims 1, 9, 11, 12 and 20 is not intended as a waiver of Appellants' right to argue the patentability of the further claims and claim elements at that later time.

The allowability of claims 1 and 12 is discussed in detail above.

Regarding claims 9, 11 and 20, it is respectfully submitted that the probe of claim 9, for example, is not anticipated or made obvious by the teachings of Erikson. For example, Erikson does

not disclose or suggest, a probe that amongst other patentable elements, comprises an (illustrative emphasis added) " the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 Mhz; an integrated circuit coupled to the attenuation backing substrate, wherein the integrated circuit is translucent to acoustic waves, wherein the integrated circuit includes a thickness of from 5  $\mu$ m to less than 50  $\mu$ m " as recited in claim 9, and as similarly recited in each of claims 11 and 20. It is respectfully submitted that Erikson does not disclose the claimed range and in fact teaches away from even its consideration.

Based on the foregoing, the Appellant respectfully submits that independent claims 1, 9, 11, 12 and 20 are patentable over Erikson and notice to this effect is earnestly solicited. Claims 2 and 13 respectively depend from one of claims 1 and 12 and accordingly are allowable for at least this reason as well as for the separately patentable elements contained in each of the claims. Accordingly, separate consideration of each of the dependent claims is respectfully requested.

Based on the foregoing, the Appellant respectfully submits that claims 2, 9, 11, 13 and 20 are patentable over Erikson and notice to this effect is earnestly solicited.

Claims 3, 10 and 14 are said to be unpatentable over Erikson in view of Odaka.

Erikson is discussed in detail above.

Odaka is cited for allegedly showing elements of the dependent claims yet does not cure the deficiencies in Erikson. Accordingly, claims 3, 10 and 14 are allowable at least based on respective dependence from one of independent claims 1, 9 and 12.

Claims 6 and 17 are said to be unpatentable over Erikson in view of Ossman.

Ossman is cited for allegedly showing elements of the dependent claims yet does not cure the deficiencies in Erikson. Accordingly, claims 16 and 17 are allowable at least based on dependence from independent claim 12.

Claims 7 and 18 are said to be unpatentable over Erikson in view of Pattanayak.

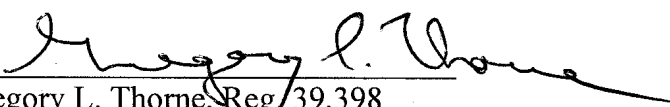
Pattanayak is cited for allegedly showing elements of the dependent claims yet does not cure the deficiencies in Erikson. Accordingly, claims 7 and 18 are allowable at least based on dependence from independent claim 1.

In addition, Appellant denies any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. Any rejections and/or points of argument not addressed would appear to be moot in view of the presented remarks. However, the Appellant reserves the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the Examiner's statements are conceded.

CONCLUSION

Claims 1-20 are patentable over any of Erikson alone and in view of any combination of Odaka, Ossman and Pattanayak. Thus the Examiner's rejection of claims 1-20 should be reversed.

Respectfully submitted,

By   
Gregory L. Thorne, Reg/39,398  
Attorney for Appellants  
October 20, 2008

**THORNE & HALAJIAN, LLP**

Applied Technology Center  
111 West Main Street  
Bay Shore, NY 11706  
Tel: (631) 665-5139  
Fax: (631) 665-5101

## APPENDIX A

### CLAIMS ON APPEAL

1. (Previously presented) An ultrasound transducer probe, comprising: an attenuation backing substrate; an integrated circuit coupled to the attenuation backing substrate, wherein the integrated circuit is translucent to acoustic waves; and an array of piezoelectric elements coupled to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof, wherein the thickness of the integrated circuit is less than 50  $\mu\text{m}$ .
2. (Original) The ultrasound transducer probe of claim 1, wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 MHz.
3. (Original) The ultrasound transducer probe of claim 1, wherein the attenuation backing substrate includes epoxy composite materials that consist of epoxy and a mixture of very high and very low acoustic impedance particles.
4. (Original) The ultrasound transducer probe of claim 1, wherein the integrated circuit includes a thickness sufficiently small for causing the integrated circuit to be translucent to acoustic waves.

5. (Previously presented) The ultrasound transducer probe of claim 1, wherein the thickness of the integrated circuit is 5  $\mu\text{m}$  or more.
6. (Original) The ultrasound transducer probe of claim 1, wherein the integrated circuit includes at least one of a silicon based, a gallium based, and a germanium based integrated circuit.
7. (Original) The ultrasound transducer probe of claim 1, wherein the array of piezoelectric elements includes a two-dimensional array.
8. (Original) The ultrasound transducer probe of claim 1, wherein the array of piezoelectric elements includes a one-dimensional array.
9. (Previously presented) An ultrasound transducer probe, comprising: an attenuation backing substrate, wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 Mhz; an integrated circuit coupled to the attenuation backing substrate, wherein the integrated circuit is translucent to acoustic waves, wherein the integrated circuit includes a thickness of from 5  $\mu\text{m}$  to less than 50  $\mu\text{m}$  and is sufficient for causing the integrated circuit to be translucent to acoustic waves; and an array of piezoelectric elements coupled to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof.

10. (Original) The ultrasound transducer probe of claim 9, wherein the attenuation backing substrate includes an epoxy composite material that consists of an epoxy and a mixture of very high and very low acoustic impedance particles, and wherein the integrated circuit includes a silicon based integrated circuit.

11. (Previously presented) An ultrasound diagnostic imaging system utilizing an ultrasound transducer probe, the transducer probe comprising: an attenuation backing substrate, wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 MHz; an integrated circuit coupled to the attenuation backing substrate, wherein the integrated circuit is translucent to acoustic waves, wherein the integrated circuit includes a thickness of from 5  $\mu$ m to less than 50  $\mu$ m and is sufficient for causing the integrated circuit to be translucent to acoustic waves; and an array of piezoelectric elements coupled to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof.

12. (Previously presented) A method of fabricating an ultrasound transducer probe, comprising: providing an attenuation backing substrate; coupling an integrated circuit to the attenuation backing substrate having a thickness less than 50  $\mu$ m, wherein the integrated circuit is translucent to acoustic waves; and coupling an array of piezoelectric elements to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof.

13. (Original) The method of claim 12, wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 MHz.

14. (Original) The method of claim 12, wherein the attenuation backing substrate includes an epoxy composite material that consists of epoxy and a mixture of very high and very low acoustic impedance particles.

15. (Original) The method of claim 12, wherein the integrated circuit includes a thickness sufficiently small for causing the integrated circuit to be translucent to acoustic waves.

16. (Previously presented) The method of claim 12, wherein the thickness of the integrated circuit is 5  $\mu\text{m}$  or more.

17. (Original) The method of claim 12, wherein the integrated circuit includes a silicon based integrated circuit.

18. (Original) The method of claim 1, wherein the array of piezoelectric elements includes a two-dimensional array.



19. (Original) The method of claim 1, wherein the array of piezoelectric elements includes a one-dimensional array.

20. (Previously presented) A method of making an ultrasound transducer probe, comprising: providing an attenuation backing substrate, wherein the attenuation backing substrate includes a material capable of providing an attenuation on the order of approximately 10 dB/cm at 5 MHz to 50 dB/cm at 5 MHz; coupling an integrated circuit to the attenuation backing substrate, wherein the integrated circuit includes a thickness of from 5  $\mu\text{m}$  to less than 50  $\mu\text{m}$  and is sufficiently small for causing the integrated circuit to be translucent to acoustic waves; and coupling an array of piezoelectric elements coupled to the integrated circuit; the array of piezoelectric elements having an acoustic matching layer disposed on a first surface of the array thereof.

## **APPENDIX B**

### **Evidence on Appeal**

None

## **APPENDIX C**

### **Related Proceedings of Appeal**

None